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Fish Sampling With a 6.1-m Trawl in Selected Texas Bays

by
Richard A. Spaw
and
Marshall H. Smith

Management Data Series
No. 43
1990



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IN SELECTED TEXAS BAYS

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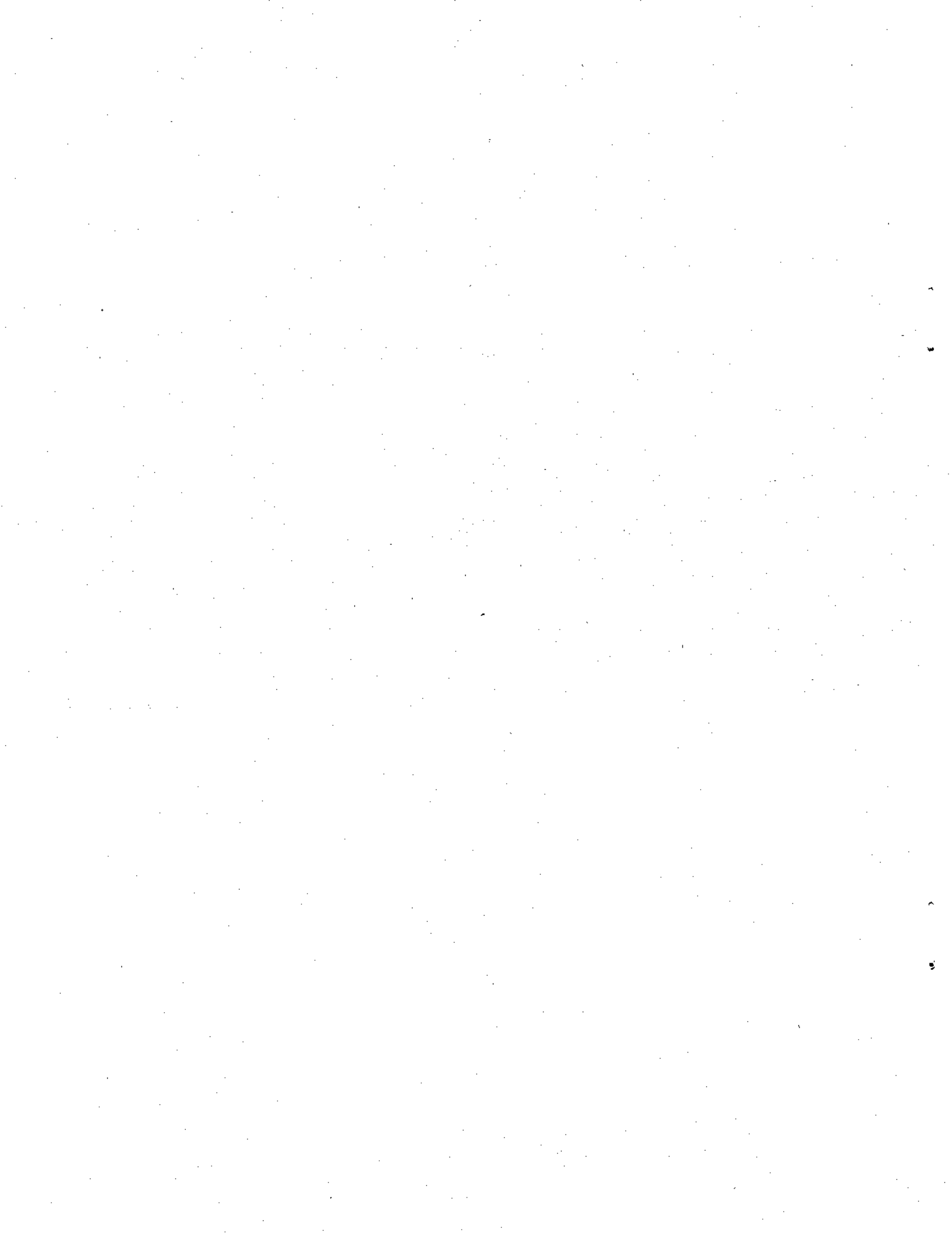
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ABSTRACT

Finfish collected during routine 6.1 m otter trawl samples in three Texas bays between November 1977 and October 1980, were counted and measured to determine mean catch rates and mean lengths. Atlantic croaker (Microponias undulatus), Gulf menhaden (Brevoortia patronus), bay anchovy (Anchoa mitchilli), spot (Leiostomus xanthurus) and sand seatrout (Cynoscion arenarius) comprised 79% of the finfish catch in 6.1-m otter trawl samples. No other fish species accounted for more than 3% of total catch. Atlantic croaker, spot and sand seatrout monthly mean catch rates were generally highest during April-July. Gulf menhaden catch rates were highest during April-May and September-October. Bay anchovy catch rates were highest during November-December. Mean lengths of finfishes varied among species and months.

INTRODUCTION

Management of marine fishery resources requires information of changes in fish populations (Rice, et al. 1987). Trawling is an effective method of monitoring annual changes in relative abundance of marine fish stocks (Pennington 1985). Otter trawls have been used to collect finfish for natural history and ecological studies along the Texas coast since 1951 (Simmons 1957; Brewer 1957).

Otter trawls have been used by the Texas Parks and Wildlife Department (TPWD) since 1958 to monitor population trends of commercially valuable shrimp (Benefield and Baker 1980, Wyatt 1959). From 1977 through 1980, finfish collected in otter trawls in Galveston, Matagorda and San Antonio Bay systems were identified, counted and measured; however, these data have not been reported. The objective of this study is to present monthly mean catch rates (no./trawl \pm 1SE) and mean total lengths (mm \pm 1SE) of all finfish species collected in 6.1-m otter trawls in those bays.

MATERIALS AND METHODS

Otter trawls (6.1-m) were used to sample finfish in Galveston, Matagorda and San Antonio Bay systems between November 1977 and October 1980. Samples were collected monthly (except January) at five randomly selected sites in each of the three bay systems. Sampling procedures and the 6.1-m otter trawls used are described in Matthews et al. (1984).

All finfish collected were identified to species and counted. Total lengths (nearest 1 mm) of the first 20 individuals of each species were obtained. Monthly mean catch rates (no./trawl \pm 1SE) and monthly mean total length (mm \pm 1SE) were calculated for each species of finfish collected.

RESULTS

Representatives of 74 finfish species were collected in 491 trawl samples between November 1977 and October 1980. Of the 18,428 finfish collected, 39% (7,171), 35% (6,414) and 26% (4,873) were collected in San Antonio, Galveston and Matagorda Bay systems, respectively (Table 1).

Atlantic croaker (Micropogonias undulatus) comprised 46% (8,478) of all finfish collected; 3,697, 2,525 and 2,256 were collected in Galveston, San Antonio and Matagorda Bays, respectively (Table 1). Gulf menhaden (Brevoortia patronus), bay anchovy (Anchoa mitchilli), spot (Leiostomus xanthurus) and sand seatrout (Cynoscion arenarius) comprised an additional 33% of finfish collected in trawl samples.

Catch rates of Atlantic croaker and spot were generally highest during April-July (Table 2). The Atlantic croaker catch rate was highest in Galveston Bay in June 1978 (101.8 fish/trawl), while the spot catch rate was highest in San Antonio Bay in May 1979 (27.0 fish/trawl). Mean lengths ranged from 52 mm and 79 mm to 162 mm for Atlantic croaker and spot, respectively. Catch rates of Gulf menhaden were generally highest during April-May and

September-October with the highest occurring in San Antonio Bay in April 1978 (101.2 fish/trawl). Mean lengths ranged from 47 to 151 mm. Catch rates of bay anchovy were generally highest during November-December with highest catch rate occurring in San Antonio Bay in December 1977 (49.8 fish/trawl). Mean lengths ranged from 26 to 84 mm. Catch rates of sand seatrout were generally highest during June-July. The highest catch rate occurred in Galveston Bay in July 1979 (26.0 fish/trawl). Mean lengths ranged from 36 to 210 mm. Monthly catch rates and mean lengths of other species varied among bay systems and months.

DISCUSSION

Three (Atlantic croaker, sand seatrout and Gulf menhaden) of the five most abundant species collected in this study support valuable recreational or commercial fisheries. Atlantic croaker and sand seatrout accounted for about 16 and 15% of the recreational landings in Texas in 1988, respectively (Maddux et al. 1989). Gulf menhaden constitutes the largest (by weight) single commercial fishery in the United States (Lassuy 1983). Moreover, this species along with bay anchovy and spot make up a significant part of the diet of important recreational fish species, including spotted seatrout, red drum and southern flounder (Darnell 1958; Stokes 1977; Reagan 1985).

Gill nets and bag seines used in TPWD's resource monitoring program target only near shore shallow water habitat. This limitation may result in an incomplete view of species composition, distribution and relative abundance of finfish species. This study demonstrates that sampling in open water with otter trawls could be used in conjunction with gill nets and bag seines to determine relative abundance, catch/effort, mean length and species composition of finfish in various life history stages.

LITERATURE CITED

- Benefield, R. L., and W. B. Baker, Jr. 1980. Studies of shrimp populations in selected coastal bays of Texas. Management Data Series Number 13. Texas Parks and Wildlife Department, Coastal Fisheries Branch. Austin, Texas.
- Breuer, J. P. 1957. An ecological study of Baffin and Alazan Bays, Texas. Publications, Institute of Marine Science. University of Texas, 4(2):134-155.
- Darnell, R. M. 1958. Food habits of fishes and larger invertebrates of Lake Pontchartrain, Louisiana, an estuarine community. Publications of the Institute of Marine Science. 5:353-416.
- Lassuy, D. R. 1983. Species profiles: life histories and environmental requirements (Gulf of Mexico)--Gulf menhaden. U.S. Fish and Wildlife Service, Division of Biological Services, FWS/OBS-82/11.2. U.S. Army Corps of Engineers, TR EL-82-4.
- Maddux, H. R., H. R. Osburn, D. L. Trimm, and K. W. Spiller. 1989. Trends in finfish landings by sport-boat fishermen in Texas marine waters, May 1974-May 1988. Management Data Series Number 8. Texas Parks and Wildlife Department, Fisheries Division. Austin, Texas.
- Matthews, G. A., D. B. Koi, and R. L. Benefield. 1984. A users guide to the inshore shrimp and hydrographic data collected by the Texas Parks and Wildlife Department from 1963 through 1980. NOAA Technical Memorandum NMFS-SEFC-140. Southeast Fisheries Center, Galveston Laboratory, Galveston, Texas.
- Pennington, M. 1985. Estimating the relative abundance of fish from a series of trawl surveys. Biometrics. 41(1):197-202.
- Reagan, R. E. 1985. Species profiles: life histories and environmental requirements of coastal fishes and invertebrates (Gulf of Mexico--red drum. U.S. Fish and Wildlife Service Biological Report 82 (11.36). U.S. Army Corps of Engineers, TR EL-82-4.
- Rice, K. W., L. W. McEachron, and P. C. Hammerschmidt. 1987. Trends in relative abundance and size of selected finfish in Texas bays: November 1975-December 1986. Management Data Series Number 139. Texas Parks and Wildlife Department, Coastal Fisheries Branch. Austin, Texas.
- Simmons, E. G. 1957. An ecological study of the upper Laguna Madre of Texas. Publications. Institute of Marine Science. University of Texas. 4(2):156-203.

Stokes, G. M. 1977. Life history studies of southern flounder (Paralichthys lethostigma) and Gulf flounder (P. albigutta) in the Aransas Bay area of Texas. Technical Series Number 25. Texas Parks and Wildlife Department. Austin, Texas

Wyatt, B. 1959. White shrimp migration in area M-6, Project Number M-6-R-1. Marine Fisheries Division Project Reports 1958-1959. Texas Game and Fisheries Division. Austin, Texas.

Table 1. Number of fish collected with a 6.1-m trawl in the Galveston, Matagorda and San Antonio Bay systems during November 1977-October 1980.

Common name	Scientific name ^a	Bay system			Total
		Galveston	Matagorda	San Antonio	
Alligator gar	<u>Lepisosteus spatula</u>	0	4	0	4
Atlantic bumper	<u>Chloroscombrus chrysurus</u>	47	55	12	114
Atlantic croaker	<u>Micropononias undulatus</u>	3,697	2,256	2,525	8,478
Atlantic cutlassfish	<u>Trichiurus lenturus</u>	80	40	1	121
Atlantic midshipman	<u>Porichthys plectrodon</u>	11	1	1	13
Atlantic moonfish	<u>Selene setapinnis</u>	1	0	0	1
Atlantic spadefish	<u>Chaetodipterus faber</u>	31	19	4	54
Atlantic stingray	<u>Dasysatis sabina</u>	4	4	1	9
Atlantic thread herring	<u>Opisthonema oglinum</u>	14	4	0	18
Atlantic threadfin	<u>Polydactylus octonemus</u>	7	20	4	31
Bay anchovy	<u>Anchoa mitchilli</u>	54	132	1,485	1,671
Bay whiff	<u>Citharichthys spilopterus</u>	111	80	2	193
Bighead searobin	<u>Prionotus tribulus</u>	81	53	6	140
Black drum	<u>Pogonias cromis</u>	10	2	24	36
Blackcheek tonguefish	<u>Symphurus plagiosa</u>	25	1	3	29
Blue catfish	<u>Ictalurus furcatus</u>	0	0	60	60
Bluefish	<u>Pomatomus saltatrix</u>	0	1	0	1
Bluntnose jack	<u>Hemicarax amblyrhynchus</u>	1	1	2	4
Bonnethead	<u>Sphyrna tiburo</u>	0	1	0	1
Crevalle jack	<u>Caranx hippos</u>	7	23	10	40
Finescale menhaden	<u>Brevoortia gunteri</u>	13	49	0	62
Flathead catfish	<u>Pyrodicthis olivaris</u>	1	0	0	1
Florida pompano	<u>Trachinotus carolinus</u>	0	1	0	1
Fringed flounder	<u>Etropus crossotus</u>	8	0	1	9
Gafftopsail catfish	<u>Bagre marinus</u>	72	77	299	448
Gizzard shad	<u>Dorosoma cepedianum</u>	13	9	72	94
Gulf butterfish	<u>Peprilus burti</u>	17	86	0	103
Gulf menhaden	<u>Brevoortia patronus</u>	643	588	1,101	2,332
Gulf pipefish	<u>Synnathus scovelli</u>	0	6	0	6
Gulf toadfish	<u>Opsanus beta</u>	4	0	2	6
Hardhead catfish	<u>Arius felis</u>	148	259	174	581
Harvestfish	<u>Peprilus aepidodus</u>	38	167	12	217
Hogchoker	<u>Trinectes maculatus</u>	6	16	8	30
Horse-eye jack	<u>Caranx latus</u>	0	3	0	3
Inland silverside	<u>Menidia beryllina</u>	0	2	0	2
Inshore lizardfish	<u>Synodus foetens</u>	4	1	1	6
Ladyfish	<u>Elops saurus</u>	0	1	0	1
Least puffer	<u>Sphoeroides parvus</u>	61	40	17	118
Lined sole	<u>Achirus lineatus</u>	2	2	0	4
Longnose gar	<u>Lepisosteus osseus</u>	0	1	0	1
Lockdown	<u>Selene vomer</u>	25	2	0	27
Ocellated flounder	<u>Ancyllopsetta quadrocellata</u>	0	5	0	5
Pigfish	<u>Orthopristis chrysoptera</u>	12	30	1	43
Finfish	<u>Lagodon rhomboides</u>	9	18	41	68
Red drum	<u>Sciaenops ocellatus</u>	0	1	0	1
Sand perch	<u>Diplectrum formosum</u>	1	0	0	1
Sand seatrout	<u>Cynoscion arenarius</u>	526	251	54	831
Scaled sardine	<u>Harengula jaguana</u>	0	0	1	1
Screwled filefish	<u>Aluterus scriptus</u>	0	0	1	1
Sheepshead	<u>Archosargus probatocephalus</u>	14	5	15	34
Sheepshead minnow	<u>Cyprinodon variegatus</u>	1	0	0	1
Silver jenny	<u>Cucinostomus gula</u>	0	1	0	1
Silver perch	<u>Bairdiella chrysoura</u>	63	185	79	327
Skilletfish	<u>Gobiesox strumosus</u>	1	1	0	2
Skipjack herring	<u>Alosa chrysochloris</u>	3	0	0	3
Smooth puffer	<u>Lagocephalus laevigatus</u>	0	1	0	1
Southern flounder	<u>Paralichthys lethostigma</u>	28	21	15	64
Southern hake	<u>Urophycis floridana</u>	2	0	0	2
Southern kingfish	<u>Menticirrhus americanus</u>	15	9	0	24
Southern stingray	<u>Dasysatis americana</u>	0	3	0	3
Spanish mackerel	<u>Scomberomorus maculatus</u>	1	3	0	4
Spanish sardine	<u>Sardinella aurita</u>	1	0	0	1
Spot	<u>Leiostomus xanthurus</u>	312	297	613	1,222
Spotted seatrout	<u>Cynoscion nebulosus</u>	6	7	13	26
Star drum	<u>Stellifer lanceolatus</u>	17	1	7	25
Striped anchovy	<u>Anchoa hepsetus</u>	0	0	2	2
Striped blenny	<u>Chasmodes bosquianus</u>	0	0	1	1
Striped burrfish	<u>Chilomycterus schoepfi</u>	1	14	0	15
Striped mullet	<u>Mugil cephalus</u>	33	10	391	434

Table 1. (Cont'd.)

Common name	Scientific name ^a	Bay system			Total
		Galveston	Matagorda	San Antonio	
Threadfin shad	<u>Dorosoma petenense</u>	31	2	9	42
Tripletail	<u>Lobotes surinamensis</u>	0	1	0	1
Unidentified herring	Family Clupeidae	0	0	66	66
Unidentified lefteye flounder	Family Bothidae	0	0	1	1
Violet goby	<u>Gobioides broussoneti</u>	1	0	0	1
White bass	<u>Morone chrysops</u>	0	0	2	2
Yellowfin mojarra	<u>Gerres cinereus</u>	0	0	2	2
Total		6,414	4,873	7,171	18,428

^aScientific names from Robins et al. (1980).

Table 2. Monthly mean catch rate (no./trawl) and weighted mean total length (mm \pm 1SE) of fishes caught in 6.1-m trawls in the Galveston, Matagorda and San Antonio Bay systems during November 1977-October 1980. Standard errors were calculated for total lengths when a species was caught in more than one trawl sample per month. Data are presented only for months in which species were caught. No samples were taken during January 1978, 1979 and 1980.

Species	Month	Galveston		Matagorda		San Antonio	
		No./trawl	Length	No./trawl	Length	No./trawl	Length
Alligator gar	Nov 1977			0.6 \pm 0.6	1,194		
	Nov 1978			0.2 \pm 0.2	1,651		
Atlantic bumper	Jun 1978			0.4 \pm 0.4	104		
	Jul			0.4 \pm 0.2	70 \pm 1		
	Aug	0.2 \pm 0.2	63				
	Sep	1.4 \pm 0.9	83 \pm 9	6.8 \pm 4.1	81 \pm 1		
	Oct	0.2 \pm 0.2	73	2.0 \pm 1.8	63 \pm 2		
	Dec			0.2 \pm 0.2	56		
	May 1979			0.2 \pm 0.2	97		
	Jun	3.0 \pm 2.3	67 \pm 1			0.2 \pm 0.2	80
	Sep					1.2 \pm 1.2	102
	Oct						
	Nov	0.2 \pm 0.2	74				
	Dec	0.2 \pm 0.2	58				
	Mar 1980	3.4 \pm 3.4	86	0.4 \pm 0.4	88		
	Sep			0.6 \pm 0.6	97		
	Oct	0.8 \pm 0.8	62			1.0 \pm 0.5	67 \pm 8
Atlantic croaker	Nov 1977	12.8 \pm 5.5	115 \pm 4	10.6 \pm 4.0	111 \pm 4	38.6 \pm 14.0	96 \pm 5
	Dec	4.0 \pm 0.9	125 \pm 3	2.0 \pm 1.8	103 \pm 1	27.8 \pm 21.9	87 \pm 3
	Feb 1978	2.4 \pm 2.2	123 \pm 1	1.8 \pm 1.6	117 \pm 1	34.6 \pm 34.1	122 \pm 1
	Mar	6.4 \pm 2.8	128 \pm 2	2.4 \pm 1.2	77 \pm 11	2.8 \pm 1.6	70 \pm 5
	Apr	39.0 \pm 18.8	95 \pm 6	20.0 \pm 7.2	96 \pm 1	21.2 \pm 8.9	94 \pm 1
	May	49.7 \pm 13.7	107 \pm 3	17.8 \pm 6.4	128 \pm 4	59.6 \pm 21.7	98 \pm 1
	Jun	101.8 \pm 44.3	95 \pm 3	24.0 \pm 14.1	104 \pm 2	5.0 \pm 2.9	117 \pm 6
	Jul	74.2 \pm 33.1	106 \pm 3	37.6 \pm 16.8	102 \pm 2	20.2 \pm 6.8	113 \pm 1
	Aug	26.8 \pm 8.7	119 \pm 2	7.6 \pm 4.9	129 \pm 1	9.2 \pm 6.4	126 \pm 1
	Sep	16.6 \pm 7.5	141 \pm 2	1.8 \pm 1.3	120 \pm 1	1.0 \pm 1.0	142
	Oct	3.6 \pm 1.8	150 \pm 3	3.0 \pm 1.5	134 \pm 1	0.6 \pm 0.4	144 \pm 1
	Nov	2.6 \pm 1.3	162 \pm 1	0.8 \pm 0.4	153 \pm 4		
	Dec	3.8 \pm 2.6	135 \pm 4			0.4 \pm 0.2	103 \pm 21
	Feb 1979	2.6 \pm 1.1	93 \pm 11			2.4 \pm 1.2	67 \pm 4
	Mar	4.8 \pm 2.1	114 \pm 7	2.4 \pm 1.6	84 \pm 1	2.4 \pm 0.8	58 \pm 2
	Apr	22.6 \pm 5.1	98 \pm 3	32.4 \pm 16.8	117 \pm 1	17.4 \pm 6.2	100 \pm 2
	May	40.0 \pm 12.0	112 \pm 4	56.4 \pm 11.3	112 \pm 3	35.4 \pm 18.2	107 \pm 2
	Jun	24.6 \pm 8.1	12 \pm 6	31.2 \pm 14.0	124 \pm 2	26.0 \pm 14.0	107 \pm 1
	Jul	22.6 \pm 3.9	110 \pm 4	7.2 \pm 1.9	121 \pm 5	45.0 \pm 21.9	118 \pm 1
	Aug	33.0 \pm 7.4	132 \pm 6	2.8 \pm 1.2	120 \pm 4	14.4 \pm 5.4	124 \pm 1
	Sep	14.8 \pm 4.1	142 \pm 8	2.8 \pm 1.7	123 \pm 1	0.4 \pm 0.4	143
	Oct	11.4 \pm 3.4	132 \pm 2	3.8 \pm 1.2	127 \pm 3	0.4 \pm 0.4	150
	Nov	9.0 \pm 6.0	143 \pm 4	2.8 \pm 1.6	123 \pm 2		
	Dec	2.0 \pm 1.8	141 \pm 1			0.6 \pm 0.6	52
	Feb 1980	15.0 \pm 4.8	114 \pm 5	0.6 \pm 0.6	96		
Mar	13.0 \pm 4.6	92 \pm 6	14.8 \pm 9.1	106 \pm 2	11.6 \pm 3.6	93 \pm 2	
Apr	79.8 \pm 22.3	100 \pm 1	62.2 \pm 6.7	107 \pm 3	63.4 \pm 23.6	113 \pm 1	
May	39.4 \pm 10.3	114 \pm 2	25.4 \pm 6.7	124 \pm 2	24.4 \pm 7.7	113 \pm 1	

Table 2. (Cont'd.)

Species	Month	Galveston		Matagorda		San Antonio	
		No./trawl	Length	No./trawl	Length	No./trawl	Length
Atlantic croaker (Cont'd.)	Jun	34.8 ± 12.2	106 ± 1	33.2 ± 10.9	119 ± 1	23.6 ± 5.8	110 ± 1
	Jul 1980	9.0 ± 4.3	124 ± 3	36.0 ± 15.1	122 ± 1	13.4 ± 3.9	123 ± 1
	Aug	14.2 ± 8.3	103 ± 3	2.8 ± 1.4	127 ± 2	3.6 ± 2.6	137 ± 1
	Sep	9.2 ± 4.7	148 ± 7	1.8 ± 1.2	140 ± 1	0.2 ± 0.2	155 ± 1
	Oct	5.2 ± 2.2	133 ± 2	3.2 ± 2.5	155 ± 1		
Atlantic cutlassfish	Mar 1978			0.6 ± 0.4	306 ± 9		
	Apr	0.8 ± 0.8	318	2.4 ± 1.3	347 ± 2		
	May	0.8 ± 0.3	420 ± 12	0.8 ± 0.8	458		
	Jun	2.5 ± 1.3	437 ± 6	0.6 ± 0.4	476 ± 6	0.2 ± 0.2	520
	Oct			0.2 ± 0.2	347		
	Mar 1979	0.4 ± 0.4	226				
	Apr	3.4 ± 2.9	307 ± 1	0.6 ± 0.4	290 ± 2		
	May	0.6 ± 0.6	350	0.4 ± 0.2	462 ± 24		
	Jun	4.2 ± 4.0	399 ± 3	0.4 ± 0.4	468		
	Aug	0.4 ± 0.2	186 ± 12				
	Apr 1980	1.0 ± 0.8	304 ± 4	0.2 ± 0.2	245		
	May	0.2 ± 0.2	330	0.4 ± 0.2	303		
	Jun	1.8 ± 1.8	423	1.0 ± 1.0	431		
	Jul	0.2 ± 0.2	530				
	Aug			0.4 ± 0.4	428		
Atlantic midshipman	Jun 1978	0.2 ± 0.2	170				
	Aug	0.2 ± 0.2	137				
	Nov	0.2 ± 0.2	88			0.2 ± 0.2	110
	Aug 1979			0.2 ± 0.2	130		
	Apr 1980	1.6 ± 1.6	135				
Atlantic moonfish	Sep 1980	0.2 ± 0.2	54				
Atlantic spadefish	Jul 1978			0.4 ± 0.4	56		
	Aug	0.4 ± 0.2	97 ± 2	1.6 ± 1.6	84	0.8 ± 0.8	93
	Oct	0.2 ± 0.2	74				
	Nov	0.2 ± 0.2	53				
	Dec	0.2 ± 0.2	64				
	Mar 1979			0.4 ± 0.4	84		
	Apr			0.2 ± 0.2	61		
	Jul			0.2 ± 0.2	87		
	Apr 1980	5.0 ± 4.0	66 ± 1				
	Jul	0.2 ± 0.2	72				
	Aug			0.2 ± 0.2	100		
	Sep			0.8 ± 0.6	100 ± 4		
Atlantic stingray	Nov 1977			0.4 ± 0.4	256		
	Jun 1978			0.2 ± 0.2	295		
	Sep	0.2 ± 0.2	153				
	Apr 1980	0.2 ± 0.2	158	0.2 ± 0.2	195		
	Jul	0.2 ± 0.2	152				
	Aug					0.2 ± 0.2	135
Sep	0.2 ± 0.2	337					

Table 2. (Cont'd.)

Species	Month	Galveston		Matagorda		San Antonio	
		No./trawl	Length	No./trawl	Length	No./trawl	Length
Atlantic thread herring	Dec 1977	1.0 ± 0.7	118 ± 3				
	Oct 1978	0.6 ± 0.6	119	0.2 ± 0.2	129		
	Apr 1979	0.2 ± 0.2	110				
	Aug	0.2 ± 0.2	126	0.2 ± 0.2	114		
	Feb 1980	0.6 ± 0.6	86				
	Apr			0.4 ± 0.2	114 ± 1		
	Jun	0.2 ± 0.2	118				
	Sep	0.2 ± 0.2	125				
Atlantic threadfin	Jun 1978			0.4 ± 0.2	140 ± 2		
	Jul			0.6 ± 0.4	161 ± 1	0.6 ± 0.6	159
	Aug	0.4 ± 0.2	174 ± 1				
	May 1979					0.2 ± 0.2	69
	Jul			1.0 ± 0.6	142 ± 1		
	Aug			0.6 ± 0.4	163 ± 3		
	Sep	0.6 ± 0.6	207				
	Nov	0.4 ± 0.4	117				
Bay anchovy	Aug 1980			1.4 ± 1.2	141 ± 2		
	Nov 1977	0.8 ± 0.5	55 ± 1			17.2 ± 8.4	45 ± 1
	Dec	0.5 ± 0.5	48	0.4 ± 0.2	52 ± 2	49.8 ± 27.8	39 ± 2
	Feb 1978					2.4 ± 1.2	45 ± 6
	Mar			0.2 ± 0.2	38	6.6 ± 2.7	38 ± 2
	Apr			1.0 ± 0.5	63 ± 1	44.0 ± 32.6	48 ± 1
	May	1.3 ± 0.6	51 ± 1	0.6 ± 0.6	49	14.2 ± 7.6	57 ± 1
	Jun 1978			0.6 ± 0.6	53	4.8 ± 2.9	44 ± 2
	Jul	0.4 ± 0.2	42 ± 1	3.6 ± 2.2	45 ± 2	5.6 ± 1.6	47 ± 1
	Aug	0.2 ± 0.2	45			4.8 ± 3.3	47 ± 1
	Sep	0.4 ± 0.4	57	6.6 ± 6.6	43	17.5 ± 12.5	37 ± 1
	Oct	0.4 ± 0.4	58			12.2 ± 5.2	45 ± 2
	Nov					34.0 ± 9.6	50 ± 2
	Dec	1.0 ± 0.6	48 ± 3			11.8 ± 3.7	43 ± 1
	Feb 1979	0.2 ± 0.2	60			2.4 ± 2.2	49 ± 1
	Mar					6.4 ± 2.9	49 ± 2
	Apr	0.2 ± 0.2	34			0.4 ± 0.2	45 ± 2
	May	0.2 ± 0.2	48			0.8 ± 0.5	52 ± 1
	Jun			0.6 ± 0.4	67 ± 4	7.0 ± 3.5	48 ± 1
	Jul	1.2 ± 1.2	48	1.0 ± 1.0	43	8.2 ± 3.3	42 ± 1
	Aug	0.4 ± 0.2	55 ± 1	0.4 ± 0.4	60	6.8 ± 4.6	49 ± 1
	Sep	0.6 ± 0.6	26	0.4 ± 0.4	62	7.0 ± 2.5	48 ± 1
	Oct	0.2 ± 0.2	62	0.6 ± 0.6	66	6.2 ± 1.7	45 ± 3
	Nov	0.2 ± 0.2	65			1.5 ± 0.6	45 ± 1
	Dec	0.2 ± 0.2	71			2.0 ± 1.3	40 ± 1
	Feb 1980	0.2 ± 0.2	60	0.2 ± 0.2	47	1.4 ± 1.0	41 ± 1
	Mar	0.2 ± 0.2	84	0.2 ± 0.2	30		
	Apr	0.2 ± 0.2	44	0.6 ± 0.4	67 ± 2	8.2 ± 8.2	58
	May			0.2 ± 0.2	52	0.8 ± 0.4	52 ± 1
	Jun			4.0 ± 1.9	46 ± 2	0.6 ± 0.4	59 ± 1
	Jul			0.2 ± 0.2	45	0.4 ± 0.4	59
	Aug	0.2 ± 0.2	43	1.4 ± 0.6	38 ± 1	9.6 ± 6.5	47 ± 1

Table 2. (Cont'd.)

Species	Month	Galveston		Matagorda		San Antonio	
		No./trawl	Length	No./trawl	Length	No./trawl	Length
Bay anchovy (Cont'd.)	Sep	1.0 ± 1.0	53	2.2 ± 1.4	50 ± 2	8.0 ± 3.5	43 ± 1
	Oct	0.4 ± 0.4	64	1.4 ± 0.7	44 ± 4	3.6 ± 1.0	52 ± 1
Baywhiff	Nov 1977						
	Dec	0.2 ± 0.2	72	7.2 ± 5.0	100 ± 1		
	May 1978	1.5 ± 1.0	72 ± 1				
	Jun	0.2 ± 0.2	82				
	Jul			0.2 ± 0.2	102	0.2 ± 0.2	98
	Aug	1.4 ± 0.7	104 ± 2	0.8 ± 0.5	118 ± 4		
	Nov	3.0 ± 1.0	89 ± 1	0.6 ± 0.2	96 ± 4		
	Dec	0.2 ± 0.2	86				
	Apr 1979			0.2 ± 0.2	79		
	May			2.0 ± 2.0	77		
	Jul			0.8 ± 0.8	88		
	Aug			0.4 ± 0.4	106		
	Oct	0.8 ± 0.8	93				
	Nov	0.4 ± 0.4	74				
	Dec	0.6 ± 0.4	73 ± 3				
	Feb 1980	1.6 ± 1.2	69 ± 3				
	Mar			0.4 ± 0.4	71		
	Apr	1.0 ± 1.0	97	0.6 ± 0.4	92 ± 1		
	May			0.4 ± 0.2	82 ± 1		
	Jun	1.4 ± 0.9	93 ± 1	0.2 ± 0.2	83		
	Jul	2.0 ± 1.1	86 ± 3	0.8 ± 0.4	108 ± 2		
	Aug	0.8 ± 0.8	76	0.2 ± 0.2	75		
	Sep	4.2 ± 1.3	94 ± 1				
Oct	2.6 ± 1.9	105 ± 2	1.2 ± 1.0	103 ± 2	0.2 ± 0.2	108	
Bighead searobin	Nov 1977			0.2 ± 0.2	48		
	Mar 1978	0.2 ± 0.2	38				
	Apr	0.4 ± 0.4	50				
	May	0.3 ± 0.2	72 ± 2				
	Nov	1.2 ± 1.0	63 ± 1	2.6 ± 1.2	47 ± 1		
	Dec	1.6 ± 1.0	44 ± 2				
	Feb 1979	0.2 ± 0.2	46				
	Mar	0.6 ± 0.4	46 ± 1	1.2 ± 1.0	54 ± 1		
	Apr	0.2 ± 0.2	58	0.6 ± 0.6	53	0.4 ± 0.2	73 ± 2
	Jun			0.2 ± 0.2	82		
	Oct	0.4 ± 0.4	37				
	Nov	1.2 ± 1.2	42				
	Dec	1.2 ± 0.8	49 ± 1				
	Feb 1980	1.6 ± 1.4	54 ± 1				
	Mar	1.4 ± 0.7	50 ± 1	3.0 ± 2.0	56 ± 1	0.4 ± 0.2	27 ± 10
	Apr	3.8 ± 2.3	62 ± 1	1.8 ± 1.0	67 ± 1	0.4 ± 0.4	98
	May	1.4 ± 1.4	59	0.6 ± 0.6	75		
	Jul	0.2 ± 0.2	115	0.2 ± 0.2	103		
	Aug	0.2 ± 0.2	110				
	Oct			0.2 ± 0.2	42		

Table 2. (Cont'd.)

Species	Month	Galveston		Matagorda		San Antonio	
		No./trawl	Length	No./trawl	Length	No./trawl	Length
Black drum	Nov 1977					0.6 ± 0.6	163
	Dec					1.8 ± 1.6	188 ± 2
	Feb 1978	0.4 ± 0.2	234 ± 13				
	Mar	0.2 ± 0.2	194				
	Oct					0.2 ± 0.2	186
	Nov			0.4 ± 0.4	146		
	Dec					0.6 ± 0.4	179 ± 8
	Feb 1979	0.2 ± 0.2	173				
	Mar	0.4 ± 0.4	186				
	Aug	0.2 ± 0.2	129				
	Oct					0.8 ± 0.8	153
	Dec	0.2 ± 0.2	154			0.8 ± 0.5	183 ± 1
	Feb 1980	0.4 ± 0.4	190				
Blackcheek tonguefish	Feb 1978	0.2 ± 0.2	48				
	Nov	1.8 ± 1.4	114 ± 2			0.2 ± 0.2	125
	Nov 1979	0.2 ± 0.2	110				
	Feb 1980	0.6 ± 0.4	116 ± 2				
	Apr	1.4 ± 1.4	113				
	Sep	0.8 ± 0.8	120			0.3 ± 0.2	122 ± 1
	Oct			0.2 ± 0.2	130		
Blue catfish	Nov 1977					0.6 ± 0.6	267
	Dec					1.2 ± 1.2	164
	Apr 1978					0.2 ± 0.2	222
	Jul					0.2 ± 0.2	255
	Oct					1.6 ± 1.4	125 ± 9
	Dec					0.8 ± 0.6	188 ± 23
	Apr 1979					1.0 ± 1.0	181
	May					1.0 ± 1.0	175
	Jun					0.2 ± 0.2	190
	Aug					5.2 ± 3.6	142 ± 1
Bluefish	May 1978			0.2 ± 0.2	192		
Bluntnose jack	Nov 1977	0.2 ± 0.2	65				
	Sep 1980			0.2 ± 0.2	111		
	Oct					0.4 ± 0.4	98
Bonnethead	Jun 1978			0.2 ± 0.2	562		
Crevalle jack	Jun 1978					0.2 ± 0.2	68
	Jul	0.2 ± 0.2	104	3.8 ± 1.6	99 ± 1	1.8 ± 1.4	96 ± 1
	Jul 1979	0.8 ± 0.8	88				
	Jun 1980	0.2 ± 0.2	65				
	Jul			0.6 ± 0.4	100 ± 1		
	Oct	0.2 ± 0.2	89	0.2 ± 0.2	65		

Table 2. (Cont'd.)

Species	Month	Galveston		Matagorda		San Antonio	
		No./trawl	Length	No./trawl	Length	No./trawl	Length
Finescale menhaden	Dec 1977	3.2 ± 1.9	75 ± 1	8.8 ± 5.6	80 ± 2		
	Feb 1978			0.4 ± 0.3	94 ± 2		
	Mar			0.6 ± 0.4	81 ± 4		
Flathead catfish	Apr 1979	0.2 ± 0.2	129				
Florida pompano	Jul 1978			0.2 ± 0.2	98		
Pinged flounder	Dec 1977	0.2 ± 0.2	102				
	Sep 1978	0.4 ± 0.4	90				
	Oct	0.4 ± 0.2	86 ± 6				
	Jun 1979	0.4 ± 0.4	90				
	Jun 1980	0.2 ± 0.2	100				
	Jul					0.2 ± 0.2	132
Gafftopsail catfish	Jul 1978			3.8 ± 1.7	94 ± 1	6.8 ± 6.1	112 ± 1
	Aug	1.0 ± 0.6	128 ± 3	0.4 ± 0.2	130 ± 2	11.0 ± 1.5	135 ± 2
	Sep	1.0 ± 0.8	153 ± 2	0.4 ± 0.4	187	4.0 ± 4.0	159
	Oct			0.2 ± 0.2	168	0.4 ± 0.2	157 ± 1
	Jul 1979	3.4 ± 3.4	118	0.8 ± 0.6	100 ± 1	5.8 ± 3.3	104 ± 3
	Aug	5.6 ± 2.7	135 ± 1	4.4 ± 1.8	140 ± 2	20.6 ± 3.1	140 ± 1
	Sep	1.0 ± 0.6	162 ± 2	0.6 ± 0.6	149	4.2 ± 2.4	153 ± 2
	Oct			0.6 ± 9.4	158 ± 1		
	Nov						
	Apr 1980	0.6 ± 0.6	152				
	May					0.2 ± 0.2	565
	Jul	0.2 ± 0.2	109	0.2 ± 0.2	260		
	Aug	1.6 ± 0.7	134 ± 2	2.6 ± 1.9	123 ± 1	7.4 ± 2.9	127 ± 2
	Sep			1.2 ± 1.2	177	1.3 ± 0.7	
	Oct			0.2 ± 0.2	160	0.2 ± 0.2	165
Cisnard shad	Dec 1977	0.5 ± 0.3	238 ± 11			0.2 ± 0.2	126
	Feb 1978	0.6 ± 0.4	237 ± 18			0.8 ± 0.8	134
	Mar					0.2 ± 0.2	116
	May			0.2 ± 0.2	209	0.2 ± 0.2	156
	Jun					0.4 ± 0.4	140
	Jul			0.4 ± 0.4	108	0.6 ± 0.4	167 ± 17
	Aug					0.6 ± 0.4	129 ± 1
	Sep			0.2 ± 0.2	115	11.5 ± 3.5	105 ± 17
	Oct					0.2 ± 0.2	94
	Nov	0.4 ± 0.4	145			0.6 ± 0.4	170 ± 21
	Dec					0.4 ± 0.4	92
	Apr 1979	0.2 ± 0.2	190				
	May	0.2 ± 0.2	123				
	Jun	0.2 ± 0.2	161				
	Jul	0.2 ± 0.2	209			0.2 ± 0.2	112
	Aug	0.4 ± 0.2	246 ± 8			3.4 ± 1.0	117 ± 3
	Sep					1.2 ± 0.7	102 ± 1
	Oct					0.2 ± 0.2	130
	Dec					0.2 ± 0.2	100

Table 2. (Cont'd.)

Species	Month	Galveston		Matagorda		San Antonio	
		No./trawl	Length	No./trawl	Length	No./trawl	Length
Gizzard shad (Cont'd.)	Feb 1980					0.2 ± 0.2	120
	Mar					0.2 ± 0.2	121
	Jun			0.4 ± 0.4	70		
	Jul			0.6 ± 0.6	120		
Gulf butterfish	Apr 1978			3.2 ± 3.0	90 ± 2		
	May	0.8 ± 0.7	60 ± 1	5.8 ± 2.0	82 ± 4		
	Jun			0.6 ± 0.6	74		
	Jul 1978			2.2 ± 1.4	90 ± 1		
	Oct			2.8 ± 1.6	110 ± 9		
	Nov	0.8 ± 0.6	68 ± 1				
	Dec	0.6 ± 0.6	64				
	Apr 1979	0.4 ± 0.4	98				
	Jun			2.0 ± 1.1	80 ± 2		
	Jul			0.2 ± 0.2	87		
	Sep	0.4 ± 0.4	98				
	Oct			0.2 ± 0.2	58		
	Apr 1980			0.2 ± 0.2	120		
	Sep	0.2 ± 0.2	48				
Gulf menhaden	Nov 1977	2.6 ± 2.1	128 ± 4	1.8 ± 1.6	117 ± 2	3.6 ± 1.3	92 ± 1
	Dec					28.4 ± 11.7	82 ± 3
	Feb 1978					0.8 ± 0.4	84 ± 1
	Mar					0.8 ± 0.5	90
	Apr	0.6 ± 0.4	112 ± 11	0.8 ± 0.4	135 ± 7	101.2 ± 92.8	47 ± 2
	May	0.5 ± 0.5	123	15.4 ± 5.3	106 ± 4	14.8 ± 5.9	68 ± 3
	Jun	0.2 ± 0.2	130	5.0 ± 2.3	82 ± 8	3.4 ± 1.2	93 ± 6
	Jul	0.4 ± 0.4	128	14.0 ± 7.0	93 ± 3	2.4 ± 1.1	83 ± 6
	Aug	1.2 ± 1.2	92			2.8 ± 2.1	93 ± 4
	Sep	0.2 ± 0.2	99	1.8 ± 1.8	115		
	Oct	14.0 ± 13.3	100 ± 1	3.6 ± 1.2	93 ± 2	7.2 ± 4.0	93 ± 6
	Nov	0.2 ± 0.2	143	1.8 ± 0.9	106 ± 3	1.6 ± 0.9	92 ± 2
	Dec	2.0 ± 1.5	129 ± 1			20.0 ± 12.0	94 ± 1
	Feb 1979	2.4 ± 1.2	118 ± 5	1.4 ± 1.2	118 ± 5		
	Mar	1.6 ± 0.8	109 ± 4	2.8 ± 1.4	110 ± 1	0.2 ± 0.2	151
	Apr	8.6 ± 3.6	126 ± 3	1.6 ± 1.1	121 ± 5		
	May	37.4 ± 26.8	101 ± 2	8.8 ± 2.7	77 ± 5	1.0 ± 0.8	93 ± 6
	Jun	8.0 ± 6.3	115 ± 2	1.4 ± 1.0	114 ± 1	0.4 ± 0.2	86 ± 2
	Jul	1.6 ± 0.5	120 ± 4	0.8 ± 0.5	101 ± 2	1.6 ± 1.4	98 ± 6
	Aug	1.6 ± 1.2	126 ± 1	3.4 ± 2.5	111 ± 2	1.4 ± 0.5	85 ± 2
	Sep	2.6 ± 1.7	131 ± 1	4.8 ± 3.2	108 ± 3	3.8 ± 1.7	98 ± 1
	Oct	0.8 ± 0.4	109 ± 2	12.6 ± 7.0	117 ± 3	3.4 ± 1.7	119 ± 8
	Nov	26.8 ± 22.2	113 ± 1	0.8 ± 0.8	99	0.8 ± 0.5	104 ± 3
	Dec	0.8 ± 0.8	116			0.2 ± 0.2	87
	Feb 1980	1.0 ± 0.5	76 ± 5			3.8 ± 2.4	84 ± 8
	Mar	1.2 ± 0.7	72 ± 12	2.8 ± 2.6	69 ± 2	0.6 ± 0.2	114 ± 15
	Apr	2.8 ± 1.7	85 ± 3	0.4 ± 0.2	108 ± 1	1.4 ± 0.9	65 ± 4
May	4.4 ± 2.7	95 ± 2	0.2 ± 0.2	78	5.8 ± 2.4	73 ± 2	
Jun	1.8 ± 1.4	126 ± 5	4.4 ± 1.4	85 ± 1	1.2 ± 0.4	95 ± 2	
Jul	1.2 ± 1.0	100 ± 1	4.4 ± 1.8	84 ± 2	2.0 ± 0.9	86 ± 4	

Table 2. (Cont'd.)

Species	Month	Galveston		Matagorda		San Antonio	
		No./trawl	Length	No./trawl	Length	No./trawl	Length
Gulf menhaden (Cont'd.)	Aug	0.6 ± 0.2	149 ± 21	3.0 ± 1.8	102 ± 3	1.0 ± 0.6	93 ± 2
	Sep	0.2 ± 0.2	113	13.2 ± 7.9	102 ± 1	0.7 ± 0.5	86 ± 4
	Oct	1.2 ± 0.5	100 ± 3	6.6 ± 4.1	102 ± 1	4.0 ± 3.5	104 ± 1
Gulf pipefish	Sep 1978			1.2 ± 1.2	74		
Gulf toadfish	Apr 1979	0.2 ± 0.2	171			0.4 ± 0.4	148
	Jul	0.2 ± 0.2	108				
	Jul 1980	0.2 ± 0.2	160				
	Aug	0.2 ± 0.2	167				
Hardhead catfish	Nov 1977	0.8 ± 0.4	110 ± 6	0.2			
	Mar 1978			0.4 ± 0.2	258 ± 19	0.2 ± 0.2	287
	Apr			0.8 ± 0.4	219 ± 12	3.0 ± 1.9	277 ± 4
	May	0.2 ± 0.2	146	2.6 ± 2.1	204 ± 1	2.0 ± 0.5	220 ± 3
	Jun			8.0 ± 3.0	183 ± 6	6.8 ± 3.9	255 ± 5
	Jul			14.6 ± 10.1	179 ± 1	1.8 ± 1.3	250 ± 4
	Aug			0.6 ± 0.4	146 ± 5	0.8 ± 0.8	94
	Sep					1.0 ± 1.0	222
	Oct	0.6 ± 0.6	155	0.6 ± 0.4	182 ± 14	0.4 ± 0.2	180 ± 33
	Nov					0.4 ± 0.2	100 ± 2
	Mar 1979	0.2 ± 0.2	245	0.8 ± 0.6	132 ± 3	1.0 ± 0.5	223 ± 8
	Apr			0.4 ± 0.2	135 ± 10	0.2 ± 0.2	285
	May			1.6 ± 0.8	122 ± 3	0.2 ± 0.2	278 ± 29
	Jun	0.6 ± 0.4	144 ± 2	1.2 ± 0.5	165 ± 10	0.4 ± 0.2	278 ± 29
	Jul	3.2 ± 1.2	156 ± 1	5.4 ± 3.4	93 ± 9	1.8 ± 0.5	165 ± 3
	Aug	8.0 ± 6.5	158 ± 1	0.4 ± 0.4	146	0.2 ± 0.2	158
	Sep	2.0 ± 1.8	174 ± 1	1.2 ± 0.5	139 ± 15	0.2 ± 0.2	137
	Oct	1.4 ± 0.7	112 ± 8	2.6 ± 1.2	157 ± 6	5.0 ± 3.8	98 ± 3
	Mar 1980	1.0 ± 0.6	163 ± 27	0.4 ± 0.2	218 ± 22	0.4 ± 0.4	220
	Apr	6.8 ± 4.3	163 ± 3	3.2 ± 1.5	143 ± 4	1.4 ± 0.7	203 ± 10
	May	0.6 ± 0.6	137	1.4 ± 0.9	175 ± 18	0.6 ± 0.6	221
	Jun	0.4 ± 0.2	170 ± 2	0.8 ± 0.4	170 ± 3	0.8 ± 0.5	220 ± 18
	Jul			1.6 ± 0.9	200 ± 9	2.2 ± 2.2	74
Aug	0.6 ± 0.4	107 ± 13	1.0 ± 0.4	165 ± 3			
Sep	1.2 ± 0.7	136 ± 11	1.0 ± 0.5	216 ± 3	0.5 ± 0.3	168 ± 31	
Oct	2.0 ± 1.3	115 ± 8	1.0 ± 0.3	171 ± 13			
Harvestfish	Apr 1978			0.4 ± 0.4	123		
	May	0.8 ± 0.8	82			0.8 ± 0.8	103
	Jun	2.8 ± 1.4	69 ± 5	0.8 ± 0.5	65 ± 1	0.2 ± 0.2	113
	Jul	1.8 ± 0.9	85 ± 1	29.6 ± 20.0	82 ± 1	0.4 ± 0.4	93
	Aug			0.2 ± 0.2	103		
	Sep			0.2 ± 0.2	187		
	Oct	0.2 ± 0.2	89			1.0 ± 1.0	81
	Nov	0.2 ± 0.2	56				
	Nov 1979			0.2 ± 0.2	145		
	Jun 1980	1.8 ± 1.8	52				
	Jul	0.2 ± 0.2	60	1.0 ± 0.5	90 ± 1		

Table 2. (Cont'd.)

Species	Month	Galveston		Matagorda		San Antonio	
		No./trawl	Length	No./trawl	Length	No./trawl	Length
Harvestfish (Cont'd.)	Sep			0.6 ± 0.4	75 ± 2		
	Oct	0.2 ± 0.2	47	0.4 ± 0.2	62 ± 1		
Herring	Mar 1979					13.2 ± 8.7	34 ± 1
Hogchoker	Nov 1977			0.4 ± 0.4	72		
	Jul 1978			0.2 ± 0.2	73		
	Nov					0.2 ± 0.2	85
	Mar 1979			1.2 ± 0.6	107 ± 3	0.2 ± 0.2	136
	Apr					0.4 ± 0.2	44 ± 15
	May						
	Oct	0.2 ± 0.2	61				
	Nov			0.2 ± 0.2	77		
	Mar 1980					0.6 ± 0.4	84 ± 1
	Apr	0.4 ± 0.4	102	0.2 ± 0.2	78		
	May			0.6 ± 0.2	75 ± 1		
	Jun	0.6 ± 0.4	69 ± 2				
Oct			0.4 ± 0.4	70	0.2 ± 0.2	55	
Horse-eye jack	Jun 1978			0.6 ± 0.6	55 ± 4		
Inland silverside	Sep 1980			0.2 ± 0.2	110		
	Oct			0.2 ± 0.2	61		
Inshore lizardfish	Nov 1977			0.2 ± 0.2	210		
	Sep 1978	0.2 ± 0.2	244				
	Aug 1980					0.2 ± 0.2	230
	Sep	0.2 ± 0.2	136				
	Oct	0.4 ± 0.4	264				
Ladyfish	Jul 1978			0.2 ± 0.2	266		
Least puffer	Nov 1977	1.4 ± 1.0	63 ± 1	2.8 ± 1.5	57 ± 1		
	Dec	1.2 ± 0.8	56 ± 3				
	Mar 1978					0.2 ± 0.2	98
	Apr			0.2 ± 0.2	118		
	May	0.2 ± 0.2	30			0.2 ± 0.2	105
	Jun					0.2 ± 0.2	35
	Jul	0.2 ± 0.2	26			0.2 ± 0.2	48
	Aug	0.2 ± 0.2	43			0.2 ± 0.2	66
	Oct	1.6 ± 1.6	57				
	Nov	1.8 ± 1.0	78 ± 2			0.6 ± 0.6	76
	Dec	0.2 ± 0.2	72				
	Mar 1979	1.4 ± 0.2	87 ± 3	0.2 ± 0.2	87		
	Apr			0.2 ± 0.2	99	0.2 ± 0.2	80
	May			0.4 ± 0.4	91		
	Jun	0.2 ± 0.2	72				
	Oct	0.4 ± 0.4	51				
	Dec	0.2 ± 0.2	86				
Feb 1980	0.4 ± 0.2	88 ± 2					

able 2. (Cont'd.)

Species	Month	Galveston		Matagorda		San Antonio	
		No./trawl	Length	No./trawl	Length	No./trawl	Length
Least puffer (Cont'd.)	Mar	0.2 ± 0.2	117			0.2 ± 0.2	95
	May	0.2 ± 0.2	105	0.6 ± 0.6	90		
	Jul	0.2 ± 0.2	55				
	Aug	0.8 ± 0.8	54			0.8 ± 0.5	43 ± 3
	Sep	0.4 ± 0.2	62 ± 2	0.4 ± 0.4	62	0.5 ± 0.3	60 ± 1
	Oct	1.2 ± 0.6	61 ± 1	3.2 ± 1.8	57 ± 1		
Lefteye flounders	Oct 1980					0.2 ± 0.2	80
Lined sole	Aug 1978			0.2 ± 0.2	90		
	Mar 1979			0.2 ± 0.2	73		
	Oct 1980	0.4 ± 0.2	62 ± 2				
Longnose gar	Sep 1978			0.2 ± 0.2	1,005		
Lookdown	Aug 1978			0.2 ± 0.2	74		
	Jun 1979	0.8 ± 0.5	53 ± 2				
	Jul	2.0 ± 2.0	64				
	Aug	0.2 ± 0.2	52				
	Oct	0.2 ± 0.2	58	0.2 ± 0.2	38		
	Nov	0.4 ± 0.4	82				
	Jun 1980	1.2 ± 1.2	65				
	Jul	0.2 ± 0.2	51				
Ocellated flounder	Apr 1979			0.2 ± 0.2	105		
	Mar 1980			0.6 ± 0.4	80 ± 8		
	May			0.2 ± 0.2	118		
Pigfish	Nov 1977			0.2 ± 0.2	182		
	Jun 1978	0.8 ± 0.8	85				
	Aug	0.2 ± 0.2	140	5.2 ± 5.2	136		
	Sep	0.8 ± 0.8	159				
	Apr 1979			0.2 ± 0.2	164		
	Aug	0.2 ± 0.2	240				
	Apr 1980			0.4 ± 0.4	174		
	May	0.4 ± 0.4	188				
	Jun	0.2 ± 0.2	47				
	Oct					0.2 ± 0.2	144
Pinfish	Nov 1977	0.2 ± 0.2	155			0.8 ± 0.8	110
	Dec					0.2 ± 0.2	80
	May 1978					0.4 ± 0.4	139
	Jul			1.6 ± 1.6	111		
	Aug			0.2 ± 0.2	143	1.0 ± 0.6	105 ± 1
	Sep	1.4 ± 0.9	137 ± 5	0.4 ± 0.4	122	0.5 ± 0.5	100
	Oct					0.6 ± 0.4	124 ± 1
	Nov					0.6 ± 0.6	113 ± 1
	Dec					0.2 ± 0.2	94
	Apr 1979			0.2 ± 0.2	139		
	Jul			0.2 ± 0.2	117		

Table 2. (Cont'd.)

Species	Month	Galveston		Matagorda		San Antonio	
		No./trawl	Length	No./trawl	Length	No./trawl	Length
Flaflsh (Cont'd.)	Feb 1980	0.2 ± 0.2	112				
	Jul					0.2 ± 0.2	103
	Aug			0.4 ± 0.4	126	2.2 ± 1.7	115 ± 1
	Sep			0.6 ± 0.4	121 ± 3	0.3 ± 0.3	120
	Oct					1.4 ± 0.9	104 ± 2
Red drum	Apr 1979			0.2 ± 0.2	130		
Sand perch	Nov 1978	0.2 ± 0.2	94				
Sand seastrout	Nov 1977	1.8 ± 0.6	137 ± 2	0.6 ± 0.6	123	1.0 ± 0.3	94 ± 9
	Dec	2.0 ± 1.7	109 ± 3				
	Apr 1978	0.4 ± 0.2	131 ± 2	0.2 ± 0.2	146		
	May	5.2 ± 2.0	127 ± 8	1.2 ± 0.5	122 ± 9	0.2 ± 0.2	207
	Jun	5.8 ± 2.1	117 ± 2	0.6 ± 0.2	95 ± 3		
	Jul	3.0 ± 2.3	132 ± 1	1.8 ± 1.0	96 ± 1	0.2 ± 0.2	103
	Aug	3.0 ± 1.3	138 ± 6	1.2 ± 0.7	166 ± 2		
	Sep	3.0 ± 1.5	156 ± 2	0.4 ± 0.4	136		
	Oct	5.8 ± 3.1	98 ± 4				
	Nov	6.0 ± 2.6	108 ± 5			1.4 ± 0.7	103 ± 4
	Dec	1.6 ± 1.0	107 ± 3				
	Mar 1979	0.4 ± 0.4	84				
	Apr	0.2 ± 0.2	148	0.6 ± 0.6	131		
	May	1.6 ± 0.5	108 ± 5	8.2 ± 3.0	96 ± 5	0.6 ± 0.6	56
	Jun	10.0 ± 5.3	135 ± 5	11.6 ± 6.1	99 ± 2	1.0 ± 0.4	90 ± 7
	Jul	26.0 ± 10.8	113 ± 5	4.4 ± 2.9	115 ± 3	0.6 ± 0.4	141 ± 7
	Aug	12.2 ± 3.7	130 ± 3	1.2 ± 0.6	126 ± 7	0.4 ± 0.4	74
	Sep	6.8 ± 3.0	152 ± 4	2.0 ± 1.5	75 ± 8	0.2 ± 0.2	79
	Oct	3.8 ± 2.6	96 ± 5	0.4 ± 0.2	176 ± 8	3.4 ± 2.7	93 ± 3
	Nov	2.8 ± 1.8	210 ± 3	0.8 ± 0.8	105		
	Dec	0.8 ± 0.5	136 ± 14			0.2 ± 0.2	102
	Mar 1980	0.2 ± 0.2	99				
	Apr	5.4 ± 4.4	119 ± 1	1.2 ± 0.4	128 ± 3		
	May	4.6 ± 1.9	136 ± 1	2.8 ± 1.5	138 ± 2		
	Jun	6.4 ± 2.2	126 ± 7	5.0 ± 3	101 ± 4	0.4 ± 0.2	80 ± 2
	Jul	1.0 ± 0.8	142 ± 7	3.6 ± 3.1	109 ± 1		
	Aug	3.4 ± 1.9	118 ± 5	1.0 ± 0.3	118 ± 2	0.4 ± 0.4	50
Sep	0.4 ± 0.2	168 ± 10	0.6 ± 0.4	101 ± 3	0.3 ± 0.2	36 ± 12	
Oct	2.2 ± 0.9	107 ± 5	0.8 ± 0.4	170 ± 14	0.4 ± 0.4	121	
Scaled sardine	Sep 1980					0.2 ± 0.2	63
Scrawled filefish	Aug 1980					0.2 ± 0.2	110
Sheepshead	Nov 1977					0.6 ± 0.6	105
	Dec					0.6 ± 0.6	184
	Mar 1978	1.0 ± 0.4	284 ± 22			0.2 ± 0.2	135
	Dec					0.4 ± 0.2	104 ± 11
	Oct 1979					0.2 ± 0.2	90
	Nov	0.2 ± 0.2	205	0.8 ± 0.8	123		

Table 2. (Cont'd.)

Species	Month	Galveston		Matagorda		San Antonio	
		No./trawl	Length	No./trawl	Length	No./trawl	Length
Sheepshead (Cont'd.)	Dec	0.2 ± 0.2	305			0.6 ± 0.6	103
	Feb 1980	1.0 ± 0.6	155 ± 6				
	Mar					0.2 ± 0.2	116
	May					0.2 ± 0.2	135
	Oct	0.4 ± 0.4	192	0.2 ± 0.2	150		
Sheepshead minnow	Dec 1978	0.2 ± 0.2	46				
Silver jenny	Sep 1980			0.2 ± 0.2	83		
Silver perch	Nov 1977			0.6 ± 0.2	129 ± 1	1.6 ± 0.8	119 ± 2
	Dec			0.2 ± 0.2	111		
	Apr 1978	0.2 ± 0.2	130	1.0 ± 0.5	124 ± 1	0.2 ± 0.2	137
	May			0.2 ± 0.2	130		
	Jul	0.8 ± 0.8	152	0.4 ± 0.4	141	1.6 ± 1.4	88 ± 1
	Aug			0.4 ± 0.4	135	2.6 ± 2.1	112 ± 2
	Sep	4.0 ± 2.5	132 ± 1	1.0 ± 1.0	88	0.5 ± 0.5	135
	Oct	0.2 ± 0.2	142	0.4 ± 0.4	140	0.2 ± 0.2	120
	Nov	0.2 ± 0.2	132	1.2 ± 1.0	137 ± 3		
	Dec					0.2 ± 0.2	136
	Mar 1979			1.4 ± 0.6	134 ± 1	0.2 ± 0.2	141
	Apr	0.2 ± 0.2	160	0.6 ± 0.6	133	0.2 ± 0.2	131
	May	0.8 ± 0.8	143			0.4 ± 0.2	138 ± 2
	Jun	1.0 ± 0.8	127 ± 1	0.4 ± 0.4	140		
	Jul	0.2 ± 0.2	160	0.2 ± 0.2	149	0.4 ± 0.4	113
	Aug	1.0 ± 1.0	147	0.2 ± 0.2	101	0.6 ± 0.6	114
	Sep	1.8 ± 1.6	148 ± 2			0.2 ± 0.2	118
	Oct	1.2 ± 1.0	147 ± 1			1.8 ± 1.8	109
	Nov			0.2 ± 0.2	124		
	Feb 1980			0.2 ± 0.2	128		
	Mar			0.2 ± 0.2	131		
	Apr	0.2 ± 0.2	140	0.8 ± 0.8	131		
	May	0.2 ± 0.2	147	1.2 ± 1.0	128 ± 1		
Jun			1.2 ± 0.6	136 ± 1	0.2 ± 0.2	152	
Jul			0.4 ± 0.4	154			
Aug			2.8 ± 2.3	89 ± 6			
Sep	0.4 ± 0.4	142	6.4 ± 3.2	101 ± 2	2.8 ± 1.7	111 ± 1	
Oct	0.2 ± 0.2	131	3.8 ± 3.8	120			
			11.6 ± 6.7	138 ± 1	2.4 ± 2.4	118	
Skilletfish	Feb 1979			0.2 ± 0.2	76		
	Apr	0.2 ± 0.2	83				
Skipjack herring	Nov 1977	0.6 ± 0.6	108				
Smooth puffer	Aug 1980			0.2 ± 0.2	95		

Table 2. (Cont'd.)

Species	Month	Galveston		Matagorda		San Antonio	
		No./trawl	Length	No./trawl	Length	No./trawl	Length
Southern flounder	Nov 1977			0.2 ± 0.2	131		
	Feb 1978					0.2 ± 0.2	165
	Mar	0.2 ± 0.2	223	0.2 ± 0.2	157		
	May	1.2 ± 0.7	121 ± 6	0.2 ± 0.2	144	0.4 ± 0.2	81 ± 7
	Jun			0.2 ± 0.2	181	0.2 ± 0.2	115 ± 7
	Aug	0.4 ± 0.4	128	0.6 ± 0.4	167 ± 8		
	Sep			0.4 ± 0.4	148		
	Nov			0.6 ± 0.4	178 ± 8		
	Dec	0.4 ± 0.4	253				
	Feb 1979			0.2 ± 0.2	152		
	Apr			0.2 ± 0.2	192	0.2 ± 0.2	148
	May	0.2 ± 0.2	224	0.4 ± 0.4	86	0.4 ± 0.4	169
	Jun	0.6 ± 0.4	182 ± 19				
	Aug	0.2 ± 0.2	139	0.2 ± 0.2	96	0.6 ± 0.4	106 ± 3
	Nov					0.2 ± 0.2	132
	Dec	0.4 ± 0.4	198			0.2 ± 0.2	157
	Feb 1980	1.2 ± 1.2	195				
	Apr	0.2 ± 0.2	237				
	Jun	0.2 ± 0.2	116	0.2 ± 0.2	278		
	Jul			0.4 ± 0.2	186 ± 26	0.6 ± 0.4	97 ± 4
Oct	0.2 ± 0.2	57	0.2 ± 0.2	125			
Southern hake	Apr 1980	0.4 ± 0.4	196				
Southern kingfish	Nov 1977			0.8 ± 0.8	153		
	Dec			0.2 ± 0.2	88		
	Jul 1978			0.2 ± 0.2	215		
	Nov	0.2 ± 0.2	151				
	Dec 1979	0.4 ± 0.4	148				
	Feb 1980	1.4 ± 1.4	143				
	Apr	0.6 ± 0.4	144 ± 7	0.4 ± 0.4	132		
	Aug			0.2 ± 0.2	214		
Sep	0.4 ± 0.2	112 ± 11					
Southern stingray	Aug 1980			0.6 ± 0.6	153		
Spanish mackerel	Jul 1978			0.6 ± 0.4	120 ± 5		
	Jul 1979	0.2 ± 0.2	147				
Spanish sardine	May 1979	0.2 ± 0.2	155				
Spot	Nov 1977	1.4 ± 0.7	122 ± 2	8.4 ± 7.9	125 ± 1	2.6 ± 1.7	103 ± 4
	Dec	4.2 ± 3.3	115 ± 1	0.2 ± 0.2	114	2.4 ± 1.4	110 ± 3
	Feb 1978	8.8 ± 8.8	116	0.4 ± 0.4	136	0.4 ± 0.4	128
	Mar	3.2 ± 2.3	117 ± 1	1.6 ± 0.8	120 ± 3		
	Apr	4.0 ± 2.0	138 ± 2	2.0 ± 1.3	143 ± 2	6.2 ± 2.6	101 ± 13
	May	1.5 ± 1.0	151 ± 9	0.6 ± 0.4	93 ± 6	6.4 ± 3.4	100 ± 3
	Jun	1.8 ± 1.8	100	7.4 ± 4.1	79 ± 1	4.4 ± 2.2	97 ± 4
	Jul	0.6 ± 0.6	110	7.2 ± 3.2	101 ± 2	13.8 ± 5.2	107 ± 2
	Aug	0.2 ± 0.2	127	5.6 ± 5.6	130	6.0 ± 3.6	119 ± 1

Table 2. (Cont'd.)

Species	Month	Galveston		Matagorda		San Antonio		
		No./trawl	Length	No./trawl	Length	No./trawl	Length	
Spot (Cont'd.)	Sep 1978	0.2 ± 0.2	148	1.6 ± 1.4	112 ± 0	12.5 ± 12.5	115	
	Oct	0.2 ± 0.2	127	0.8 ± 0.6	123 ± 3	5.0 ± 3.3	121 ± 1	
	Nov			3.4 ± 2.3	126 ± 2	0.6 ± 0.2	139 ± 3	
	Dec	1.4 ± 1.2	149 ± 1					
	Feb 1979	0.4 ± 0.2	130 ± 7					
	Mar	2.8 ± 2.6	141 ± 1	0.4 ± 0.2	145 ± 2			
	Apr	1.0 ± 0.6	162 ± 4	0.8 ± 0.4	129 ± 9	0.4 ± 0.4	86	
	May	6.0 ± 5.0	95 ± 1	6.0 ± 2.9	86 ± 3	27.0 ± 22.9	93 ± 1	
	Jun	1.0 ± 0.5	113 ± 9	2.2 ± 2.2	109	1.0 ± 0.4	95 ± 4	
	Jul	7.2 ± 6.7	93 ± 2	1.2 ± 1.2	102	1.0 ± 0.8	100 ± 1	
	Aug			0.2 ± 0.2	92	0.2 ± 0.2	102	
	Sep	1.8 ± 0.9	114 ± 2			0.2 ± 0.2	98	
	Oct	2.8 ± 2.6	120 ± 1	1.6 ± 1.6	123	0.2 ± 0.2	125	
	Nov	0.6 ± 0.2	115 ± 1	0.6 ± 0.4	125 ± 1	0.2 ± 0.2	142	
	Feb 1980	3.4 ± 3.4	126					
	Mar	3.6 ± 2.9	156 ± 1	0.2 ± 0.2	138	0.2 ± 0.2	129	
	Apr			2.6 ± 1.5	99 ± 6	20.4 ± 19.9	84 ± 1	
	May	2.4 ± 1.1	106 ± 3	2.0 ± 1.8	97 ± 4	1.6 ± 0.9	92 ± 1	
	Jun	1.2 ± 0.6	111 ± 1	0.4 ± 0.4	131	14.6 ± 11.5	103 ± 1	
	Jul	0.4 ± 0.4	120	0.4 ± 0.2	104 ± 8	1.0 ± 1.0	101	
	Aug	0.6 ± 0.6	138			1.2 ± 1.2	115	
	Oct	0.6 ± 0.4	118 ± 1	1.6 ± 1.2	138 ± 3	0.6 ± 0.6	128	
	Spotted seatrout	Nov 1977			0.2 ± 0.2	148	0.2 ± 0.2	204
		Dec					0.4 ± 0.4	162
		Feb 1978					0.2 ± 0.2	144
		Mar	0.2 ± 0.2	205				
		May					0.2 ± 0.2	210
Aug						0.2 ± 0.2	84	
Nov				0.4 ± 0.2	178 ± 5	0.2 ± 0.2	62	
Dec		0.2 ± 0.2	130			0.2 ± 0.2	91	
Apr 1979				0.4 ± 0.4	166	0.2 ± 0.2	163	
May		0.2 ± 0.2	212	0.2 ± 0.2	207			
Oct				0.2 ± 0.2	169			
Nov						0.2 ± 0.2	98	
Dec						0.4 ± 0.4	100	
Feb 1980		0.2 ± 0.2	158					
Mar		0.2 ± 0.2	169					
Aug						0.2 ± 0.2	146	
Oct		0.2 ± 0.2	158					
Star drum	Nov 1977	0.6 ± 0.6	81					
	Apr 1978	0.4 ± 0.4	74					
	May	0.3 ± 0.3	91					
	May 1979			0.2 ± 0.2	110			
	Aug	0.6 ± 0.4	79 ± 5					
	Oct	0.2 ± 0.2	118			1.0 ± 1.0	73	
	Nov					0.2 ± 0.2	58	
Dec	0.2 ± 0.2	86						

Table 2. (Cont'd.)

Species	Month	Galveston		Matagorda		San Antonio	
		No./trawl	Length	No./trawl	Length	No./trawl	Length
Star drum (Cont'd.)	Apr 1980	0.2 ± 0.2	81				
	Jun	0.2 ± 0.2	103				
	Aug	0.2 ± 0.2	83				
	Oct	0.4 ± 0.2	74 ± 1			0.2 ± 0.2	91
Striped anchovy	Sep 1980					0.3 ± 0.2	61 ± 5
Striped blenny	Jul 1979					0.2 ± 0.2	76
Striped burrfish	Aug 1978			2.0 ± 2.0	124		
	Sep	0.2 ± 0.2	35				
	Mar 1979			0.2 ± 0.2	143		
	Apr			0.4 ± 0.4	156		
	Jun			0.2 ± 0.2	145		
Striped mullet	Nov 1977					12.0 ± 9.4	137 ± 3
	Dec					5.6 ± 3.4	130 ± 5
	Feb 1978	2.8 ± 2.1	230 ± 4			34.8 ± 33.6	196 ± 1
	Mar	0.2 ± 0.2	260			0.2 ± 0.2	125
	Apr					4.4 ± 2.9	154 ± 2
	May			0.8 ± 0.6	159 ± 1		
	Jun			0.4 ± 0.4	158	6.4 ± 5.7	189 ± 2
	Jul 1978					4.2 ± 3.0	175 ± 6
	Aug					0.2 ± 0.2	116
	Sep					0.5 ± 0.5	134
	Oct					0.2 ± 0.2	130
	Nov					0.4 ± 0.4	256
	Feb 1979	1.6 ± 1.6	252			0.2 ± 0.2	169
	Mar	0.6 ± 0.4	233 ± 1	0.2 ± 0.2	191	0.4 ± 0.4	130
	Apr	0.4 ± 0.2	272 ± 12				
	Jul	0.4 ± 0.4	300	0.4 ± 0.2	158 ± 8		
	Aug			0.2 ± 0.2	122	2.4 ± 2.4	128
	Dec					1.8 ± 1.1	128 ± 7
	Feb 1980	0.4 ± 0.4	218				
	Mar	0.2 ± 0.2	215			1.6 ± 1.4	146 ± 1
May					3.2 ± 3.2	158	
Threadfin shad	Nov 1977					0.8 ± 0.4	101 ± 2
	Dec					0.2 ± 0.2	140
	Feb 1978	0.2 ± 0.2	76				
	Mar			0.4 ± 0.4	88		
	Nov	0.6 ± 0.2	119 ± 3				
	Dec	0.2 ± 0.2	115				
	Feb 1979	0.6 ± 0.2	110 ± 1				
	Mar	0.8 ± 0.8	128				
	May	1.0 ± 1.0	159				
	Aug					0.2 ± 0.2	75
	Oct	1.4 ± 1.4	119			0.4 ± 0.2	100 ± 7

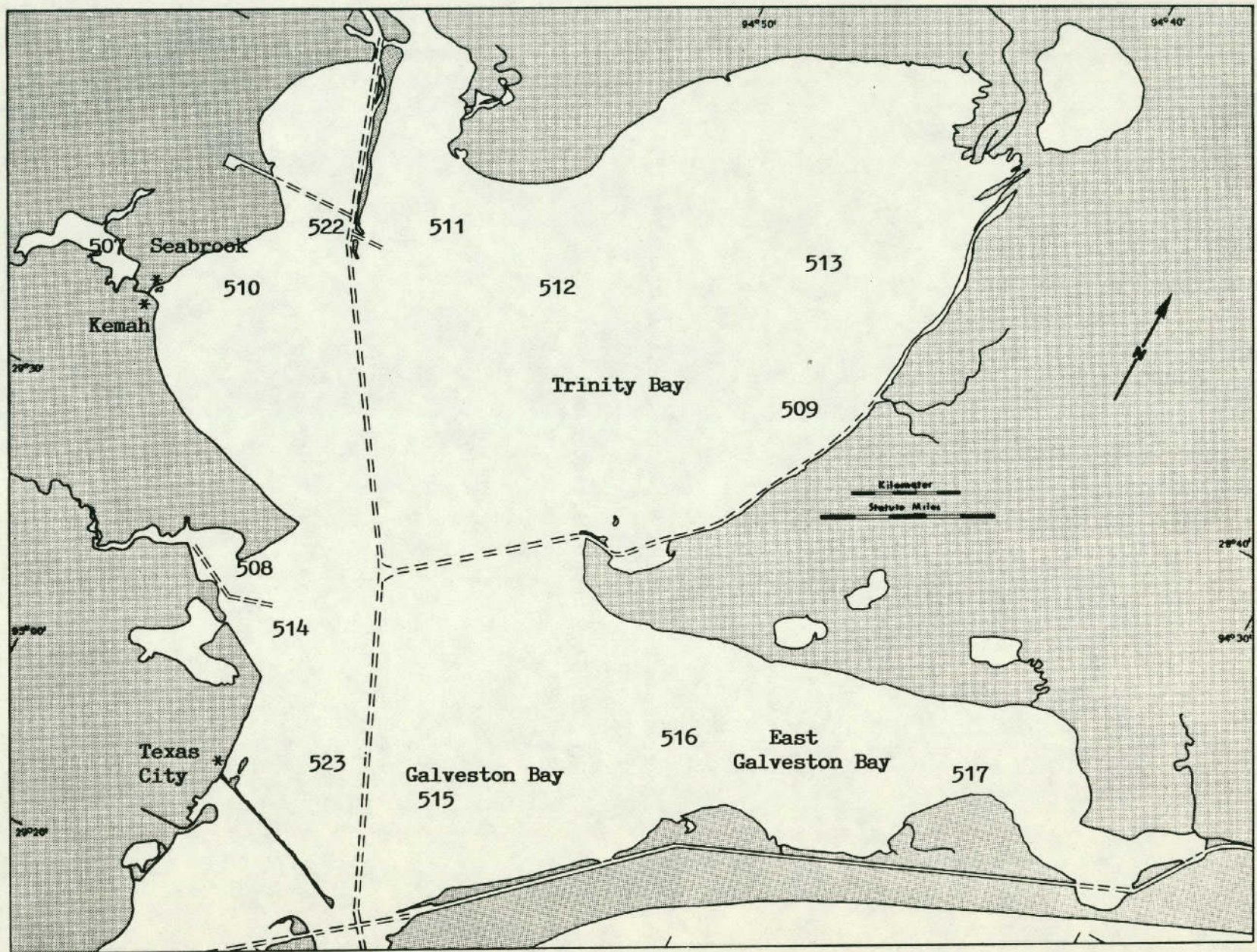
Table 2. (Cont'd.)

Species	Month	Galveston		Matagorda		San Antonio	
		No./trawl	Length	No./trawl	Length	No./trawl	Length
Threadfin shad (Cont'd.)	Jun 1980	0.8 ± 0.8	173				
	Jul					0.2 ± 0.2	115
	Oct	0.6 ± 0.6	122				
Tripletail	Jun 1978			0.2 ± 0.2	208		
Violet goby	Apr 1980	0.2 ± 0.2	300				
White bass	Aug 1979					0.4 ± 0.4	136
Yellowfin mojarra	Dec 1978					0.4 ± 0.4	64

Figure 1. Galveston Bay system 6.1-m trawl sites (November 1977-October 1980).

- (A) Trinity, upper Galveston and East Bays.
- (B) West Bay

(A)



(B)

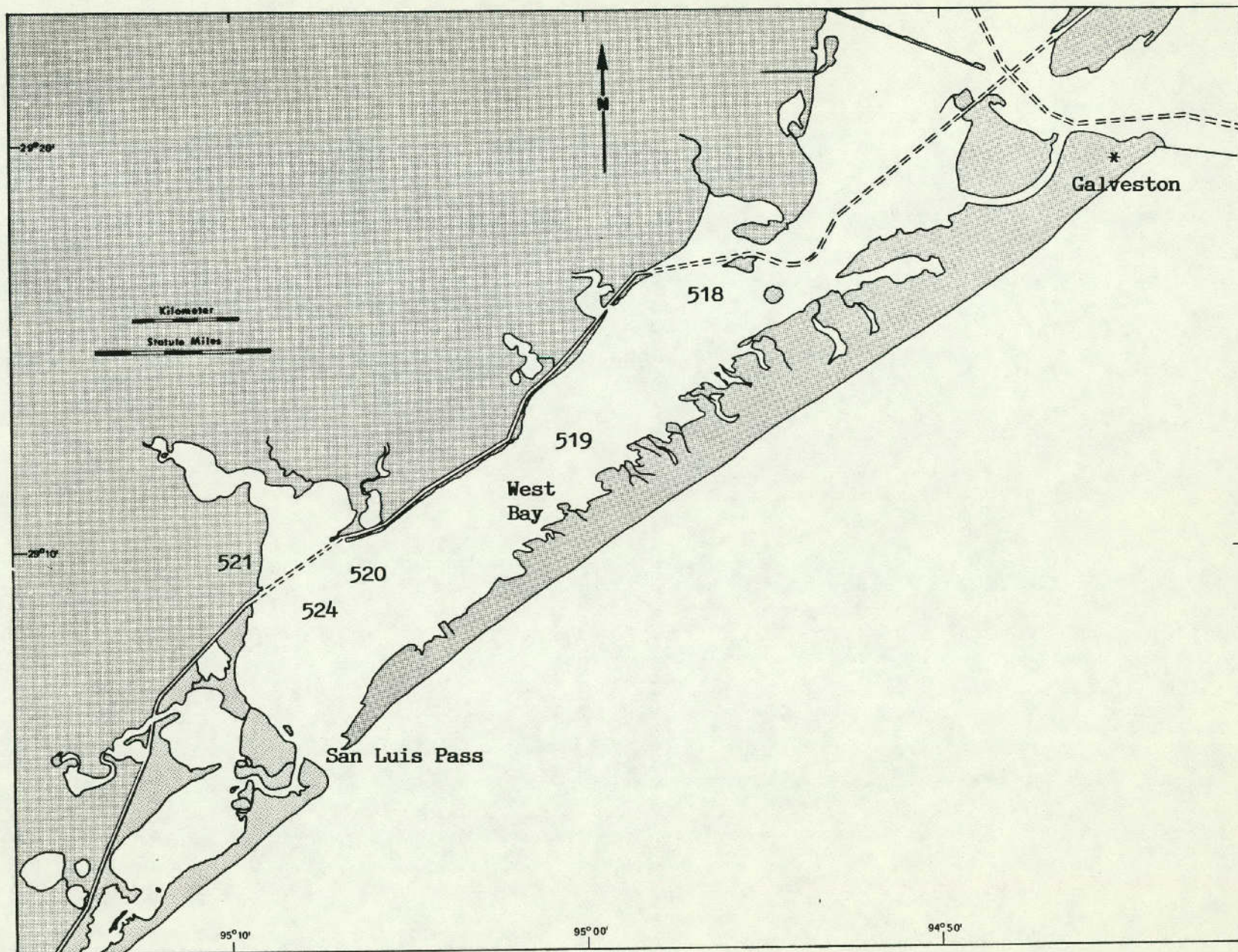
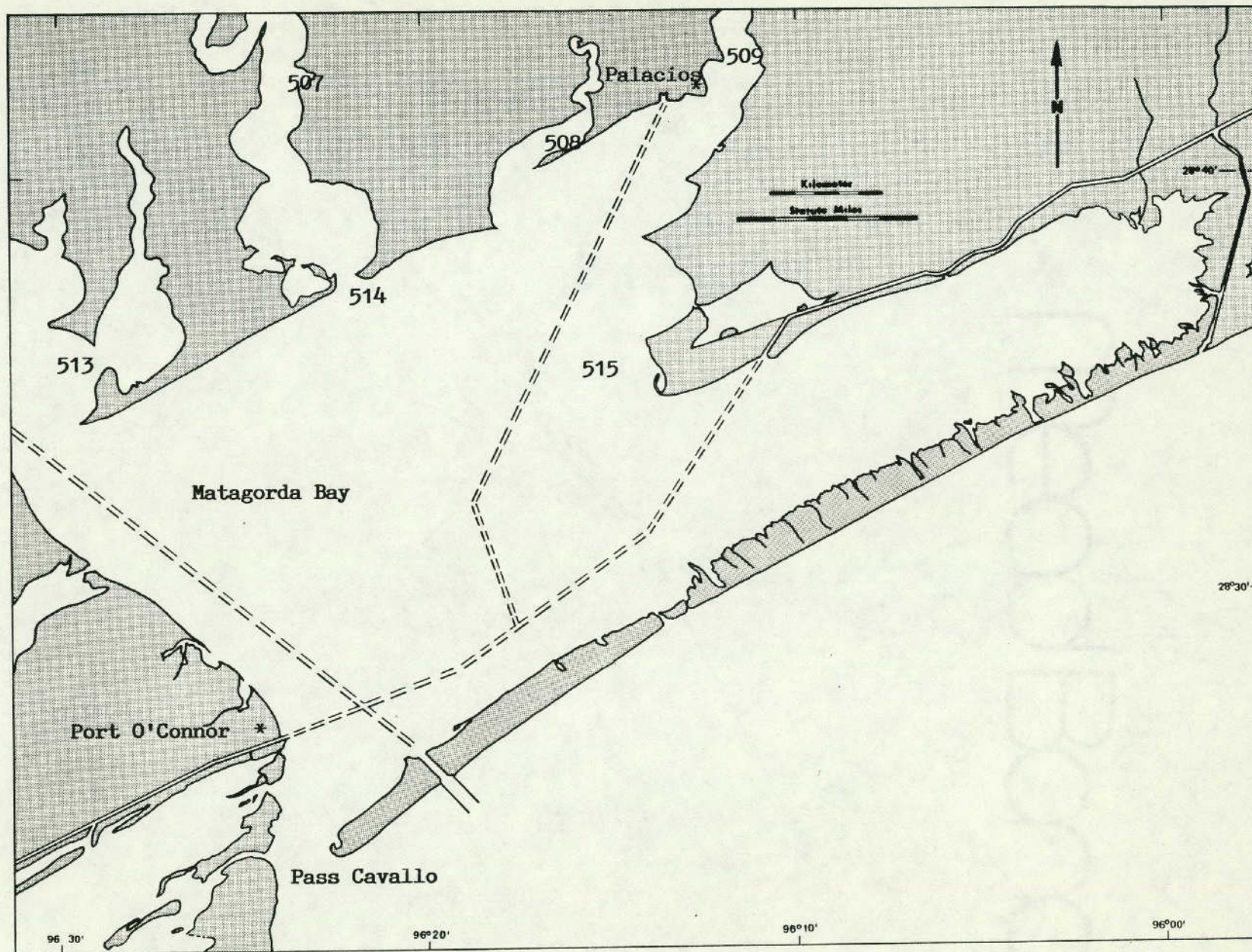
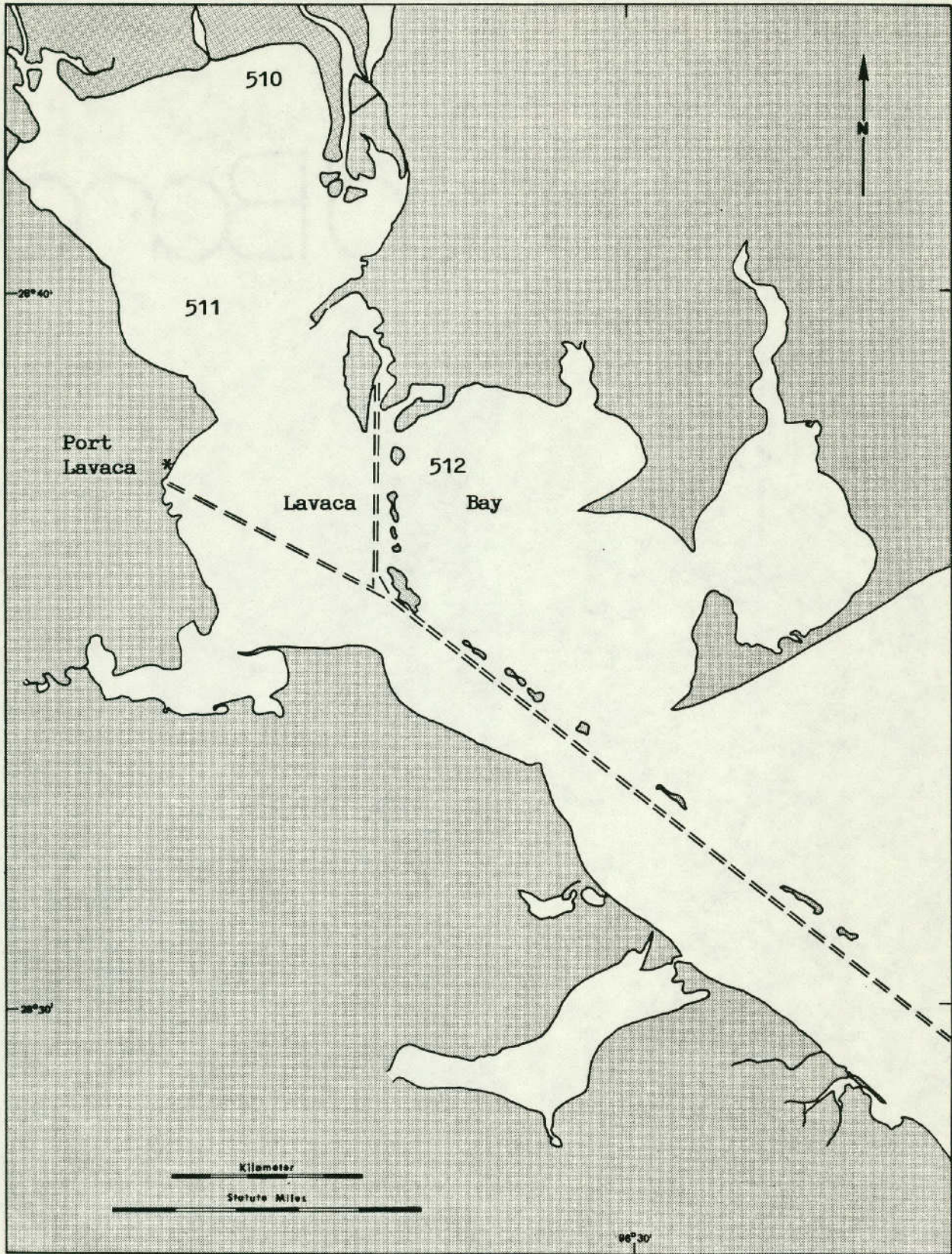


Figure 2. Matagorda Bay system 6.1-m trawl sites (November 1977-October 1980).

- (A) Matagorda Bay
- (B) Lavaca Bay

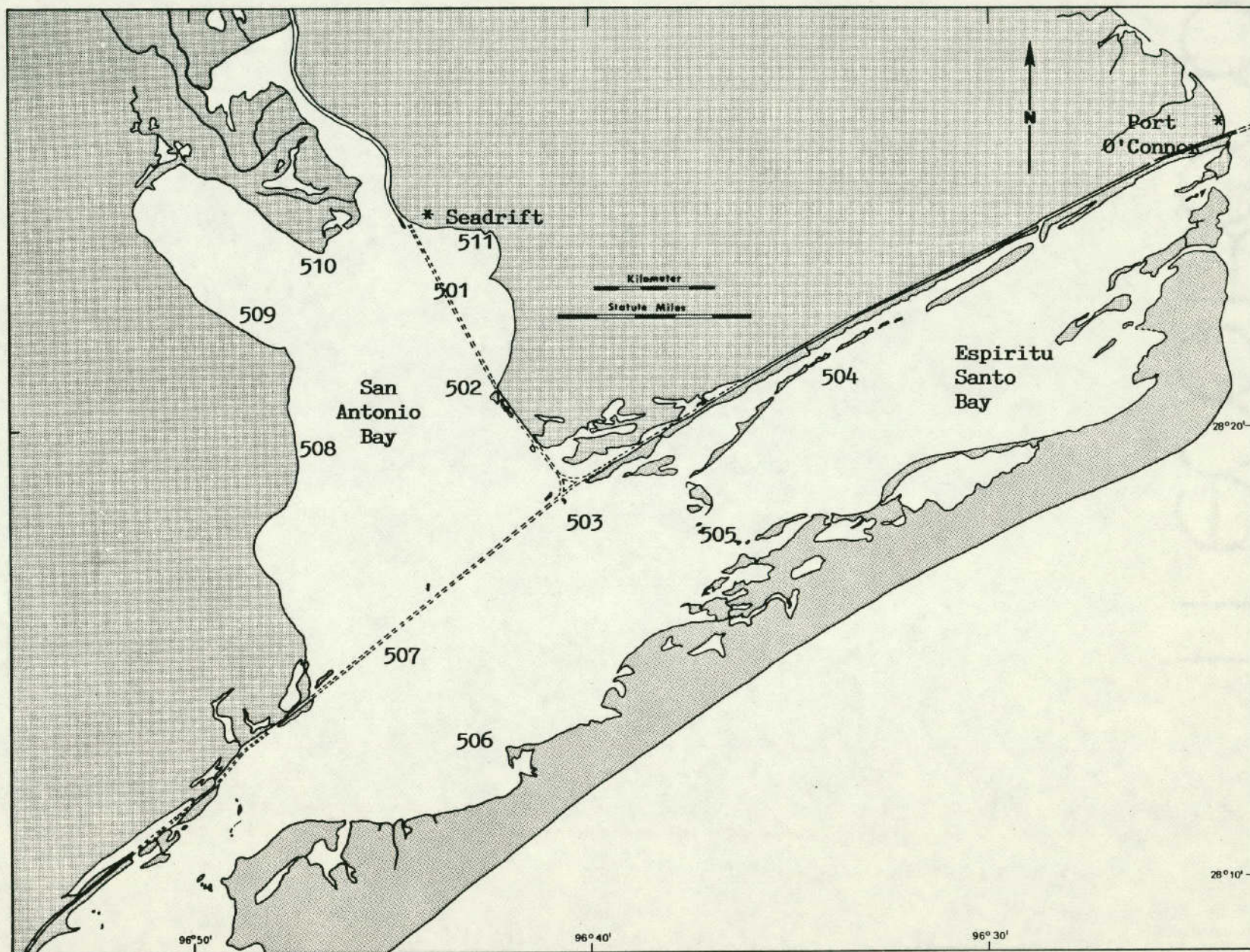
(A)





(B)

Figure 3. San Antonio Bay system 6.1-m trawl sites (November 1977-October 1980).



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